

**AMENDMENTS TO THE CLAIMS**

1. (Currently Amended) A computing device, comprising:  
a processor;  
a memory coupled to the processor; and  
program instructions provided to the memory and executable by the processor to:  
track a virtual address space for a process associated with a device connected to the computing device;  
release a physical address space associated with the virtual address space when the device has a connection removed from the computing device;  
~~register by providing~~ provide an indication in ~~[[the]]~~ a virtual memory data structure ~~[[for]]~~ associated with the process that the virtual address space, previously available to the process, is no longer valid for ~~process~~ use by the process;  
wherein registering the indication is triggered by detection that the physical address space that was being used by processes associated with the device has been released; and  
wherein the registering indication occurs ~~[[as]]~~ responsive to the physical address space ~~[[is]]~~ being released and before release of the virtual address space by the process.
2. (Original) The computing device of claim 1, wherein the device includes a device which can be mapped to memory.
3. (Original) The computing device of claim 1, wherein the virtual address space includes an input/output space.
4. (Original) The computing device of claim 1, wherein the program instructions are part of a memory management system which includes a virtual memory data structure associated with the process.

5. (Original) The computing device of claim 4, wherein the program instructions execute to register the virtual address space is no longer valid for process use in the virtual memory data structure associated with the process.

6. (Original) The computing device of claim 1, wherein the program instructions execute to allocate the virtual address space when the process requests physical memory.

7. (Original) The computing device of claim 1, wherein the program instructions execute to register that the virtual address space is available for use when the process releases the virtual address space.

8. (Currently Amended) A computing device, comprising:

- a processor;
- a random access memory coupled to the processor; and
- program instructions provided to the memory and executable by the processor, the program instructions are part of a memory management system to:
  - dereference a virtual address space for a process associated with a removable memory mappable device connected to the computing device;
  - release a physical address space associated with the virtual address space when the device associated with the process is logically disconnected; and
  - register by providing an indication in [[the]] a virtual memory data structure for the process that the virtual address space is no longer available to the process;

wherein to register is triggered by detection that the physical address space that was being used by processes associated with the device has been released; and

wherein to register occurs as the physical address space is released and before release of the virtual address space by the process.

9. (Previously Presented) The computing device of claim 8, wherein the program instructions execute to unmap the virtual address space in a manner which do not violate semantics for an operating system of the computing device.

10. (Original) The computing device of claim 9, wherein the operating system is selected from the group of a Unix operating system and a Linux operating system.

11. (Original) The computing device of claim 8, wherein the program instructions execute to allow the process to unmap the virtual address space subsequent to the release of the physical address space.

12. (Original) The computing device of claim 8, wherein the program instructions execute to indicate an operation as failed if the process attempts to perform the operation subsequent to registering that the virtual address space is no longer valid for process use.

13. (Currently Amended) A computing device, comprising:  
a processor;  
a memory coupled to the processor, the memory including program instructions for maintaining a virtual memory data structure specific to a process as part of a memory management system; and  
means for unmapping a virtual address space for [[a]] the process that is triggered as a physical address space used by the process is being released, in a manner which does not violate semantics for an operating system of the computing device, when a removable memory mappable device associated with the process is logically disconnected.

14. (Original) The computing device of claim 13, wherein the program instructions execute to dereference the virtual address space for the process.

15. (Previously Presented) The computing device of claim 13, wherein the means for unmapping the virtual address space includes program instructions which execute to maintain a representation of an object associated with the process in the virtual memory data structure of the process.

16. (Previously Presented) The computing device of claim 15, wherein the means for unmapping the virtual address space includes program instructions which execute to remove a mapping of the object to physical memory.

17. (Previously Presented) The computing device of claim 16, wherein the means for unmapping the virtual address space includes program instructions which execute to register in the virtual memory data structure of the process that the virtual address space associated with the process is not available for use subsequent to when the mapping of the object to physical memory has been removed.

18. (Previously Presented) The computing device of claim 17, wherein the program instructions execute to set a bit in a region of the virtual memory data structure to indicate that the virtual address space is not available for use.

19. (Previously Presented) A method for memory management on a computing device, comprising:

dereferencing a memory address for a process associated with a removable memory mappable device;

mapping a representation of an object associated with the process in a virtual memory data structure associated with the process;

removing the object from physical memory when the device is logically disconnected from the computing device; and

providing an indication in the virtual memory data structure for the process that a virtual address space is no longer available for use by the process as triggered by detection of a physical address space used by the process being released and when the object is removed from physical memory, without removing the representation of the object from the virtual memory data structure for the process.

20. (Original) The method of claim 19, further including unmapping the virtual address space at the request of the process subsequent to the device being logically disconnected from the computing device.

21. (Original) The method of claim 19, further including indicating an operation as failed if the process attempts to perform the operation subsequent the device being logically disconnected from the computing device.

22. (Previously Presented) A method for memory management, comprising:  
tracking a virtual address space for a process associated with a removable memory mappable device connected to a computing device;  
releasing a physical address space when the device has a logical connection removed from the computing device; and  
at the release of the physical address space used by the process and before the process has released the virtual address space, registering an indication in a virtual memory data structure for the process that the virtual address space is not available to the process in a manner which does not violate semantics of an operating system.

23. (Currently Amended) A computer readable storage medium having computer readable instructions stored thereon for execution by a device to perform a method, comprising:  
dereferencing a virtual address space for a process associated with a removable memory mappable device as part of a memory management system on a computing device;

releasing a physical address space when the device is logically disconnected from the computing device; and

at the release of the physical address space used by the process and before the process has released the virtual address space, registering an indication in a virtual memory data structure for the process that the virtual address space is no longer available to the process in a manner which does not violate semantics for an operating system the computing device.